GRIFFIN INTERNATIONAL INC.

SEP 25 9 46 AM '98

September 24, 1998

Mr. George Desch
Vermont ANR/DEC
Waste Management Division
103 South Main St. /West Building
Waterbury, VT 05671-0404

RE: Initial Investigation of Suspected Subsurface Petroleum Contamination
Cortina Inn, Vermont (VTDEC Site #97-2326)

Dear Mr. Desch:

Enclosed please find the summary report for the site investigation conducted at the Cortina Inn in Killington, Vermont.

I am recommending that the Cortina Inn site be considered for closure and removed from the VTDEC Active Hazardous Waste Sites List.

Please contact me if you have any questions or comments.

Sincerely,

Christine Ward
Hydrogeologist

Enclosure

c.: Mr. Bob Harnish, Cortina Inn (w/o enclosure)
Mr. William Cunningham, Liberty Mortgage (w/o enclosure)
Mr. Joe Manning, Manning & Associates (w/o enclosure)
Mr. Joe Kozlik, via fax (802) 775-6810
GI#119741145

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INITIAL INVESTIGATION OF SUSPECTED SUBSURFACE PETROLEUM CONTAMINATION

CORTINA INN
ROUTE 4
MENDON, VERMONT

(VTDEC SITE #97-2326)
GI #119741145

September 1998

Prepared for

Cortina Inn
HCR34, Box 33
Killington, VT 05751-7604

Prepared by

GRIFFIN INTERNATIONAL

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I. INTRODUCTION

This report summarizes the initial investigation of suspected subsurface petroleum contamination at the Cortina Inn on Route 4 in Mendon, Vermont (see Site Location Map, Appendix A). This Site Investigation was conducted under the VTDEC Site Expressway Plan. This work was performed generally in accordance with Griffin's December 22, 1997, *Work Plan and Cost Estimate for an Initial Subsurface Investigation of Suspected Petroleum Contamination* prepared for Bob Harnish of the Cortina Inn.

II. SITE BACKGROUND

A. Site History

On December 11, 1997, petroleum contamination was detected at the Cortina Inn during soil field screening at the in-place closure of a 2,000-gallon #2 fuel oil underground storage tank (UST) [2]. Soil samples collected during the UST closure were screened for volatile organic compounds (VOCs) using an HNu™ systems Model HW-101 portable photoionization detector (PID). The soil samples collected from beneath the ends of the UST had field VOC readings of 140 parts per million (ppm) and 190 ppm. The field VOC readings exceeded the VTDEC accepted action level for fuel oil USTs of 10 ppm. These soil samples were submitted for laboratory analysis of diesel range organics by Method 8015-DRO. This analysis was a requirement for the finance company which serves the Cortina Inn. The analytical results of the soil samples indicate concentrations of total petroleum hydrocarbons (TPH) of 2,300 ppm and 2,700 ppm. The accepted state guideline for TPH in soils is 1,000 ppm.

On August 10, 1998, the 8,000-gallon fuel oil UST, located on the west side of the Cortina Inn, was closed in place [3]. This UST was located under the floor of the maintenance area. The soil samples collected from beneath the ends of the UST had field VOC readings of 10 ppm and 7 ppm. These samples were submitted for laboratory analysis of diesel range organics by Method 8015-DRO. The analytical results of these soil samples indicate concentrations TPH of 4.6 ppm and 5.1 ppm. These field VOC and analytical results were at or below the VTDEC accepted action levels.

As a result of the petroleum contamination detected in the subsurface beneath the former 2,000-gallon fuel oil UST, additional site investigation was required by the VTDEC in order to determine the extent and degree of petroleum contamination.

B. Site Description

The Cortina Inn is a two story-building of wood and masonry construction, with a basement. The surface topography across the site, and the area in general, slopes toward the south. The property is bounded on the east by Route 4. The area to the north and west is generally wooded. Exposed bedrock was observed on the hill behind (northeast) the Cortina Inn. The nearest surface water is a small pond immediately south of the Cortina Inn. A drainage swale along Route 4 discharges into the small pond through a 2 foot diameter culvert that is located on the southeast side of the Cortina Inn.

The area is served by private water systems. The Cortina Inn is serviced by two supply wells. Both supply wells are reportedly completed in bedrock according to Mr. Bob Harnish, owner of the Cortina Inn. The supply wells are located on the west side of the Cortina Inn. One supply well is close to the building, approximately 120 feet northwest of the 2,000-gallon UST. The other supply well is approximately 500 feet west of the building (see Site Sketch, Appendix A).

C. Site Geology

According to the Surficial Geologic Map of Vermont [4], the site is underlain by glaciofluvial kame moraine and kame complex with morainic topography. Bedrock below the site is mapped as the Mount Holly complex, consisting of quartzite, micaceous quartzite, and quartz-mica schist [5].

III. INVESTIGATIVE PROCEDURES

To further define the extent of subsurface petroleum contamination in the area of the former 2,000-gallon fuel oil UST, the following investigative tasks were undertaken: soil borings; monitoring well installations; determination of groundwater flow direction and gradient; groundwater sample collection and analyses for petroleum related constituents; supply well sample collection and analysis, indoor air screening, and a sensitive receptor survey.

A. Monitoring Well Installation

Four shallow monitoring wells, MW-1 through MW-4, were installed on September 1, 1998, by T&K Drilling, Inc., under the direct supervision of a Griffin hydrogeologist. The soil borings for the monitoring wells were advanced with a truck mounted 4 1/4" hollow stem auger. The monitoring well locations are indicated on the Site Sketch (Appendix A).

During borehole advancement, a two-foot split spoon sampler was advanced ahead of the augers. Undisturbed soil samples, collected from the borings with the split spoon sampler, were logged

by the supervising hydrogeologist and screened for the presence of VOCs using an HNu™ systems Model HW-101 PID. Prior to screening, the PID was calibrated with isobutylene referenced to benzene. Soils were screened using the Griffin Jar/Polyethylene Bag Headspace Screening Protocol, which conforms to state and industry standards. Soil characteristics and contaminant concentrations were recorded by the hydrogeologist in detailed well logs which are presented in Appendix B.

Monitoring well MW-1 was installed adjacent to the former 2,000-gallon fuel oil UST. Split spoon samples were collected continuously in this boring from a depth of 5 feet to 15 feet, which was the maximum extent of the boring. The soil sample collected from 9 to 11 feet below grade in the boring for MW-1 had a VOC reading of 40 parts per million (ppm) as measured with the PID. A slight fuel oil odor was detected from the soil samples collected from a depth of 9 feet to the bottom of the boring. Since a VOC reading exceeding the VTDEC accepted action level for fuel oil of 10 ppm was detected, the other three proposed monitoring wells were installed.

Monitoring well MW-2 was installed approximately 80 feet south-southeast of the former 2,000-gallon UST. Monitoring well MW-3 was installed approximately 60 feet east of the former 2,000-gallon UST. Monitoring well MW-4 was installed approximately 150 feet southeast of the former 2,000-gallon UST. The monitoring wells were positioned to avoid overhead and known subsurface obstacles. Soil samples were collected from the borings for MW-2, MW-3, and MW-4 with the split spoon sampler at 5 foot intervals. Non-detect to very low VOC readings were measured with the PID from the soils collected from the borings for monitoring wells MW-2, MW-3, and MW-4. No olfactory or visual indications of petroleum were noted from the soil samples from the borings for monitoring wells MW-2, MW-3, or MW-4.

Soils in the borings consisted primarily of silty sand. Cobbles and boulders were encountered with the split spoon sampler and with the augers in the borings for MW-2, MW-3 and MW-4. The location of MW-3 was moved approximately 10 feet west when refusal was encountered at 5 feet below grade in the original location for this boring. A layer of peat was encountered in the boring for MW-3 from 5 to 7 feet below grade. Bedrock refusal was encountered in the borings for MW-1 and MW-4 at a depth of 15 feet below grade.

The water table was encountered at approximately 10 feet below grade in the borings for the four monitoring wells.

Each of the new monitoring wells was constructed in a similar fashion, with two-inch diameter, Schedule 40 PVC well screen and riser. Each well contains a ten-foot length of 0.010-inch, factory-slotted screen, which was set from 5 feet to 15 feet below grade. A sand pack was installed in the annular space around the well screen from the bottom of the boring to one and a half feet above the top of the screened interval in each borehole. A one-foot thick bentonite surface seal was then installed above the sand pack. Above the bentonite seal, the annular space was backfilled with native material. Each well was fitted with a gripper cap, and secured with a water-tight road box. The road box on each well is flush-mounted, set in concrete, and suitable

for vehicular traffic. The new monitoring wells were developed by bailing immediately after installation.

B. Groundwater Flow Direction and Gradient

Water table elevation measurements were collected from the four on-site monitoring wells on September 10, 1998. The top of casing elevations were determined relative to MW-1, which was arbitrarily set at 100 feet. The depth to water in each well was subtracted from the top of casing elevation to obtain the relative water table elevation. Water level data are presented in Appendix C. No free phase product was detected in the wells on September 10, 1998. Water table elevations were plotted on the site map to generate the Groundwater Contour Map figure presented in Appendix A.

The relative water table elevations measured on September 10, 1998, suggest that groundwater flow at the site is directed generally toward the south at a hydraulic gradient of approximately 2%. The depth to groundwater measured on September 10, 1998, was approximately 8 to 10 feet below ground surface.

Based on this flow direction, monitoring well MW-1 is located in the source area of the former 2,000-gallon UST. Monitoring well MW-2 is located in a downgradient direction from the former 2,000-gallon UST. Monitoring well MW-3 is located in a crossgradient direction from the former 2,000-gallon UST. Monitoring well MW-4 is located in an downgradient to crossgradient direction from the former UST.

C. Groundwater Water Sampling and Analyses

Griffin collected groundwater samples from the four on-site monitoring wells on September 10, 1998. The groundwater samples were analyzed by Endyne, Inc. of Williston, Vermont, by EPA Method 8021B for the presence of benzene, toluene, ethylbenzene, and xylenes (BTEX), methyl tertiary butyl ether (MTBE), naphthalene, and the alkylbenzenes: 1,3,5-trimethylbenzene and 1,2,4-trimethylbenzene. Additionally, the groundwater samples were analyzed by modified EPA Method 8100 for TPH. The results are summarized in Appendix D.

The laboratory analysis report is contained in Appendix E. Analytical results of the trip blank and duplicate samples indicate that adequate quality assurance and control were maintained during sample collection and analysis.

Naphthalene, 1,3,5-trimethyl benzene and 1,2,4-trimethyl benzene were detected in the groundwater sample collected from source area well MW-1 in concentrations exceeding the Vermont Groundwater Enforcement Standards (VGESs) for these compounds. A concentration of ethylbenzene, below the VGES, was also detected in the sample from MW-1. A low concentration of TPH, 3.24 ppm, was detected in the groundwater sample collected from MW-1.

The groundwater samples collected from monitoring wells MW-2, MW-3, and MW 4 had no detectable levels of petroleum compounds.

D. Supply Well Sampling and Analyses

The Cortina Inn is serviced by two supply wells. Both supply wells are reportedly completed in bedrock. Griffin collected a water sample on August 6, 1998, from a tap which is positioned in-line in the plumbing after water from the two wells was mixed but prior to the water softener. The sample was analyzed for EPA Method 602 compounds by EPA Method 8260. The laboratory analysis report is contained in Appendix F.

No VOCs were detected by laboratory analysis in the supply well water sample.

E. Indoor Air Screening

Griffin screened the indoor air of the basement area adjacent to the former 2,000-gallon fuel oil UST during the sampling event on September 10, 1998.

No VOCs were detected with the PID in the basement area.

F. Sensitive Receptor Survey

A qualitative risk assessment was conducted to identify known and potential receptors of the limited contamination detected at the Cortina Inn. A visual survey was conducted during the UST closure inspections on December 11, 1997 and on August 10, 1998, as well as during the monitoring well installation on September 1, 1998. Based on these observations, a determination of the potential risk to identified receptors was made.

The Cortina Inn is serviced by two supply wells. Both supply wells are reportedly completed in bedrock. A water sample was collected on August 6, 1998, from a tap which is positioned in-line in the plumbing after water from the two wells was mixed but prior to the water softener. The sample was analyzed for EPA Method 602 compounds by EPA Method 8260; no VOCs were detected in the water sample. The risk of impact to the Cortina Inn supply well is considered minimal since no VOCs were detected by laboratory analysis in the collected water sample and given the low source area strength. Additionally, the supply wells are positioned in a direction upgradient from the source area with respect to the shallow groundwater flow.

The air space of the basement adjacent to the former 2,000-gallon UST was screened for the presence of VOCs using a PID during the sampling event on September 10, 1998. No VOCs were detected.

Potential receptors of the suspected petroleum contamination are the soil and groundwater in the immediate vicinity of the former UST, and the indoor air space of the basement of the Cortina Inn. Based on the nondetection of VOCs in the Cortina Inn supply water and the nondetection of VOCs in the basement air space, the risk of impact to the potential receptors is considered to be minimal. No sensitive receptors are impacted at this time except soils and groundwater in the vicinity of the former UST.

IV. CONTAMINANT FATE AND TRANSPORT

Residual petroleum exists in the vicinity of the former 2,000-gallon UST at the Cortina Inn. The level of dissolved contamination detected in the groundwater is relatively low. No BTEX compounds were detected above the VGES. Low concentrations of naphthalene and the trimethylbenzenes, slightly exceeding the VGES for these compounds were detected in the groundwater sample collected from monitoring well MW-1. Adsorbed contamination was detected in the soils immediately adjacent to the former 2,000-gallon UST during the UST closure and subsequent soil boring installation. Free product has not been detected in any of the on-site monitoring wells.

To obtain a rough estimate of groundwater transport rates across the site, the average linear velocity of the groundwater may be calculated. By assuming a hydraulic conductivity of 3.3×10^{-5} ft/sec and a porosity of 30% for the silty sand [6], and using the estimated hydraulic gradient of 2%, the velocity of the site groundwater is calculated to be approximately 69 ft/year.

At this calculated flow rate, groundwater passing the former UST pit would take just slightly over one year to reach monitoring well MW-2. Given the age of the former UST (31 years) it is likely that, had there been a significant release of fuel oil from the UST, petroleum compounds would have been present in the groundwater sample collected from the downgradient monitoring well MW-2.

V. CONCLUSIONS

Based on the results of this investigation at the Cortina Inn, Griffin presents the following conclusions:

1) The source of petroleum contamination detected in soils at the Cortina Inn was the former 2,000-gallon fuel oil UST at the property. The release(s) appears to be the result of minor leaks, spills or overfills due to normal usage over time. The volume of product released

is unknown. The source of the petroleum contamination (i.e., the UST system) was removed via in-place closure in December of 1997.

2) VOC readings of soils collected during the UST closure in December of 1997 indicate that adsorbed petroleum compounds exist in the soils in the immediate vicinity of the former UST pit. With the source UST closed, it is expected that adsorbed petroleum compound concentrations will decrease over time with the progressive action of natural mitigative processes including biodegradation, volatilization, and diffusion.

3) The 8,000-gallon fuel oil UST at the Cortina Inn was closed in-place on August 10, 1998. Soil VOC readings, as measured with the PID, ranged from 0.2 to 10 ppm. Two soil sample collected from beneath the UST were analyzed for diesel range organics by Method 8015-DRO. The analytical results of these soil samples indicate concentrations TPH of 4.6 ppm and 5.1 ppm. These field VOC and analytical results were at or below the VTDEC accepted action levels, and suggest that no substantial petroleum release has occurred relative to this former UST.

4) Four groundwater monitoring wells, MW-1 through MW-4, were installed by Griffin at the Cortina Inn on September 1, 1998. Monitoring well MW-1 was installed in the source area of the 2,000-gallon fuel oil UST. Monitoring wells MW-2, MW-3, and MW-4 were installed in hydraulically crossgradient to downgradient directions from the UST. VOCs were not detected by field screening methods in soil samples collected from the borings for monitoring wells MW-2, MW-3, and MW-4. These results indicate that the adsorbed contamination is limited to the direct vicinity of the former 2,000-gallon UST.

5) The depth to groundwater measured on September 10, 1998, was approximately 8 to 10 feet below the ground surface. The shallow groundwater flow beneath the site on this date was estimated to be directed toward the southeast at a hydraulic gradient of approximately 2%.

6) Groundwater samples were collected from the four site monitoring wells on September 10, 1998. Relatively low concentrations of naphthalene, 1,3,5-trimethylbenzene, and 1,2,4-trimethylbenzene, slightly exceeding the VGES, were detected in the groundwater sample collected from MW-1. TPH was detected at a concentration of 3.24 ppm in the sample collected from MW-1. No VOCs or TPHs were detected by laboratory analysis in the groundwater samples collected from monitoring wells MW-2, MW-3, and MW-4. These results indicate that the downgradient extent of dissolved contamination relative to the former 2,000-gallon fuel oil UST has been defined, and is limited to the close vicinity of the former UST.

7) A water sample was collected on August 6, 1998, from the supply wells servicing the Cortina Inn. The supply wells are in a upgradient direction from the former USTs with respect to the surficial aquifer. No VOCs were detected by laboratory analysis in the supply well sample.

8) The air space of the basement adjacent to the former 2,000-gallon UST was screened for the presence of VOCs using a PID during the sampling event on September 10, 1998. No VOCs were detected.

9) There appear to be no significant risks to identified sensitive receptors in the vicinity of the Cortina Inn based on currently available data.

VI. RECOMMENDATIONS

Based on the results of this site investigation, Griffin recommends that the Cortina Inn site in Mendon, Vermont be considered for closure and be removed from the VTDEC Active Hazardous Waste Sites List. This recommendation is offered based upon achievement of the following closure criteria, as per the VTDEC Site Management Activity Completed (SMAC) Checklist (dated December 1, 1997):

1) The source(s), nature, and extent of the petroleum contamination at the site has been adequately defined.

   Reference conclusions #1, 2, 4, and 6.

2) The source(s) has been removed, remediated, or adequately contained.

   Reference conclusion #1.

3) Levels of contaminants in soil and groundwater shall be stable, falling, or non-detectable.

   No detectable readings of VOCs above background were measured in soil samples from the downgradient and crossgradient soil borings on September 1, 1998.

   VOCs and TPHs were not detected in the groundwater samples collected from the downgradient and crossgradient monitoring wells, MW-2, MW-3, and MW-4, on September 1, 1998. Detection limits in the analyses were well below the VGES.

   Low levels of petroleum contamination were detected in the groundwater sample collected from the source area monitoring well MW-1.

   VOCs were not detected in the water sample collected from the supply well servicing the Cortina Inn. Detection limits for the targeted constituents were well below Drinking Water Standards.

4) Groundwater enforcement standards are met at the following compliance points:

Any point of present use of groundwater as a source of potable water: VOCs were not detected in the supply well sample collected on August 6, 1998. Detection limits in the analyses were well below the VGES.

Any point at or within the boundary of any Class I groundwater area: The Cortina Inn is not within a Class I groundwater area.

Any point at the boundary of the property on which the contaminant source is located: VOCs and TPHs were not detected in the groundwater samples collected from the downgradient and crossgradient monitoring wells MW-2, MW-3, and MW-4 on September 10, 1998. Detection limits in the analyses were well below the VGES. The extent of contamination is limited to the source area, well with the property boundary.

5) Soil guideline levels are met. If not, engineering or institutional controls are in place.

VOC readings of 0.6 to 40 ppm were measured with the PID in soil samples from the soil boring for monitoring well MW-1, located in the source area. The highest reading of 40 ppm was detected at a depth of 9 to 11 feet below grade, thus isolating the soils from surface contact. At the surface, these soils are covered with landscaping.

No detectable readings of VOCs above background were measured with the PID in soil samples the from soil borings for monitoring wells MW-2, MW-3, and MW-4 on September 1, 1998.

6) No unacceptable threat to human health or the environment exists on site.

Low concentrations of petroleum compounds were detected in the groundwater sample collected from monitoring well MW-1, located in the source area. No petroleum compounds were detected by laboratory analysis in the groundwater samples collected from downgradient and crossgradient monitoring wells MW-2, MW-3, and MW-4 on September 10, 1998. No petroleum compounds were detected by laboratory analysis in the water sample collected the supply well. No VOCs were detected with the PID in the basement airspace adjacent to the former 2,000-gallon fuel oil UST on September 10, 1998.

There are no known sensitive receptors adversely affected.

7) Site meets RCRA requirements.

Available records indicate that the Cortina Inn is not in violation of the Resource Conservation and Recovery Act (RCRA) as defined in 40 CFR 264.

8) Site meets CERCLA requirements.

Available records indicate that the Cortina Inn is not in violation of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as defined in 40 CFR 300.

REFERENCES

1. USGS 7.5 Minute Topographic Maps, Chittenden, VT quadrangle, dated 1961 and photorevised 1988, and Pico Peak, VT quadrangle, dated 1961 and photorevised 1980.

2. Griffin International, *UST Closure Inspection, Cortina Inn, Killington, Vermont*, letter report to Ms. Sue Thayer, State of Vermont, Department of Environmental Conservation, Waste Management Division, dated December 16, 1997.

3. Griffin International, *UST Closure Inspection, Cortina Inn, Mendon, Vermont*, letter report to Ms. Sue Thayer, Vermont ANR/DEC, Waste Management Division, dated August 18, 1998.

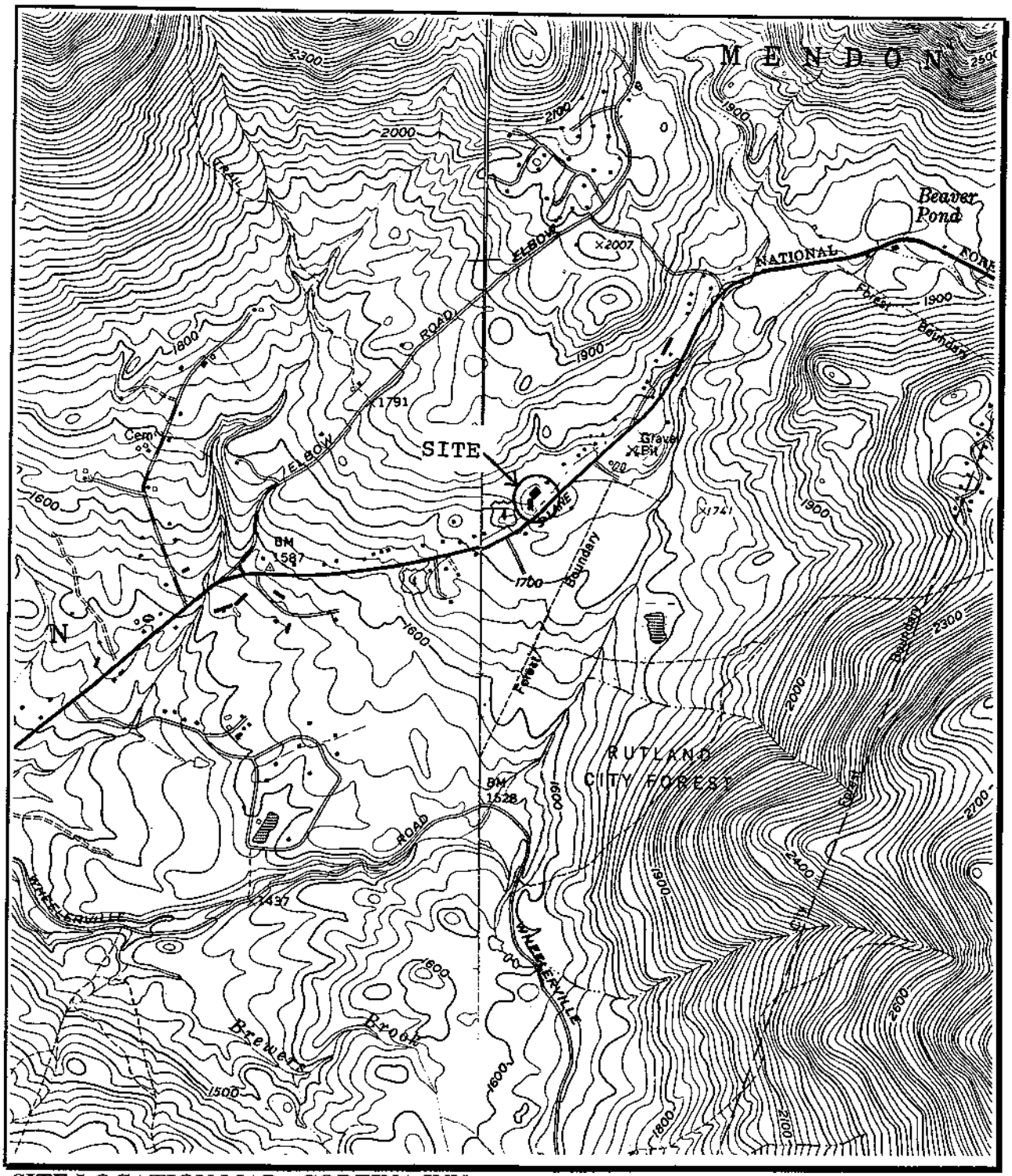
4. Doll, Charles G., ed., 1970, *Surficial Geologic Map of Vermont*, Vermont Geological Survey.

5. Doll, Charles G., ed., 1961, *Centennial Geologic Map of Vermont*, Vermont Geological Survey.

6. Freeze, R.A. and J.A. Cherry. 1979. Groundwater. Prentice-Hall, Inc., Englewood Cliffs, New Jersey.

APPENDIX A

Site Location Map
Site Sketch
Groundwater Contour Map

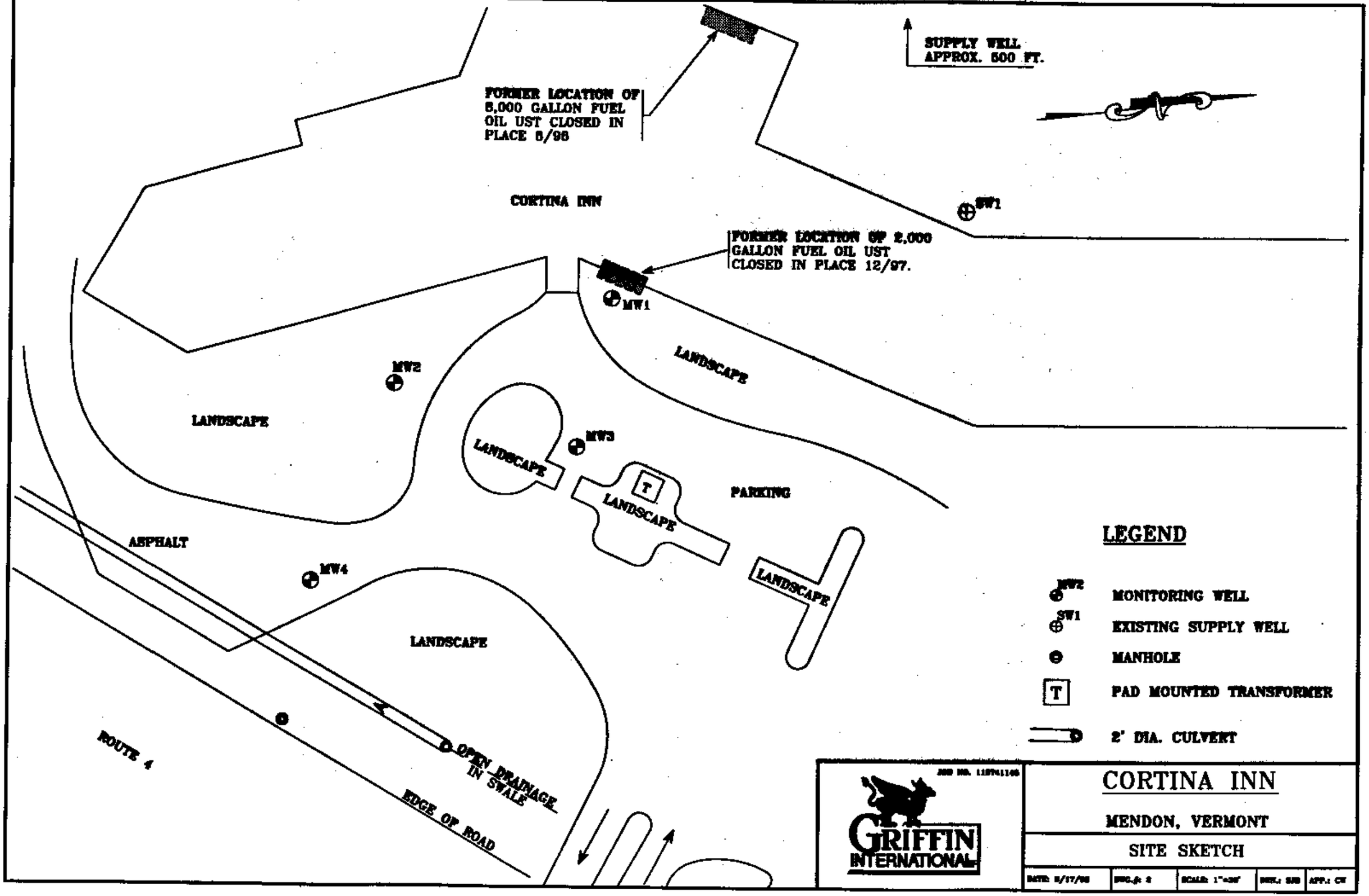


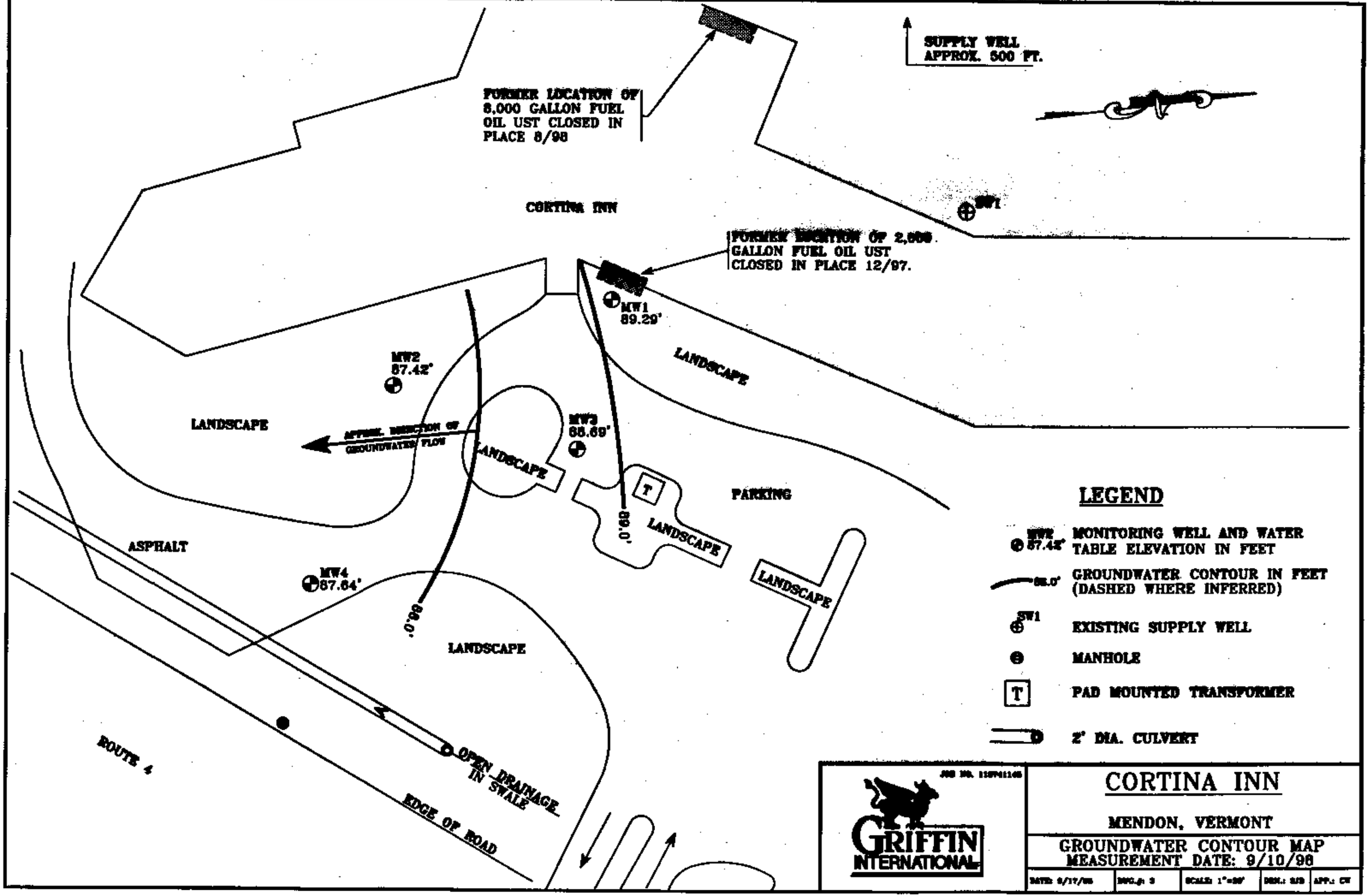
SITE LOCATION MAP - CORTINA INN

Mendon, Vermont

Source: USGS 7.5 minute quadrangles: Chittenden VT, dated 1961, photorevised 1988; and Pico Peak, VT, dated 1961 and photorevised 1980.

Scale: 1:24,000


SUPPLY WELL
APPROX. 500 FT.
FORMER LOCATION OF 6,000 GALLON FUEL OIL UST CLOSED IN PLACE 6/98
CORTINA INN
SW1
FORMER LOCATION OF 2,000 GALLON FUEL OIL UST CLOSED IN PLACE 12/97.
MW1
MW2
LANDSCAPE
LANDSCAPE
LANDSCAPE
MW3
LANDSCAPE
T
PARKING
LANDSCAPE
ASPHALT
MW4
LANDSCAPE
OPEN DRAINAGE IN SWALE
ROUTE 4
EDGE OF ROAD
LEGEND
MW2 MONITORING WELL
SW1 EXISTING SUPPLY WELL
MANHOLE
T PAD MOUNTED TRANSFORMER
2' DIA. CULVERT
JOB NO. 118741146
GRIFFIN INTERNATIONAL
CORTINA INN
MENDON, VERMONT
SITE SKETCH
DATE: 5/17/98
DWG.#: 4
SCALE: 1"=30'
DES.: SRB
APP.: CW


SUPPLY WELL
APPROX. 500 FT.
FORMER LOCATION OF 8,000 GALLON FUEL OIL UST CLOSED IN PLACE 8/98
CORTINA INN
SW1
FORMER LOCATION OF 2,000 GALLON FUEL OIL UST CLOSED IN PLACE 12/97.
MW1
89.29'
MW2
87.42'
MW3
88.69'
LANDSCAPE
LANDSCAPE
LANDSCAPE
LANDSCAPE
LANDSCAPE
APPROX. DIRECTION OF GROUNDWATER FLOW
88.0'
88.0'
T
PARKING
ASPHALT
MW4
87.64'
LANDSCAPE
ROUTE 4
OPEN DRAINAGE IN SWALE
EDGE OF ROAD
LEGEND
MW2 87.42' MONITORING WELL AND WATER TABLE ELEVATION IN FEET
88.0' GROUNDWATER CONTOUR IN FEET (DASHED WHERE INFERRED)
SW1 EXISTING SUPPLY WELL
MANHOLE
T PAD MOUNTED TRANSFORMER
2" DIA. CULVERT
GRIFFIN INTERNATIONAL
CORTINA INN
MENDON, VERMONT
GROUNDWATER CONTOUR MAP
MEASUREMENT DATE: 9/10/98

APPENDIX B

Soil Logs and Monitoring Well Specifications

PROJECT CORTINA INN

LOCATION MENDON, VERMONT

DATE DRILLED 9/1/98 TOTAL DEPTH OF HOLE 15.0'

DIAMETER 4.25"

SCREEN DIA. 2" LENGTH 10.0' SLOT SIZE 0.010"

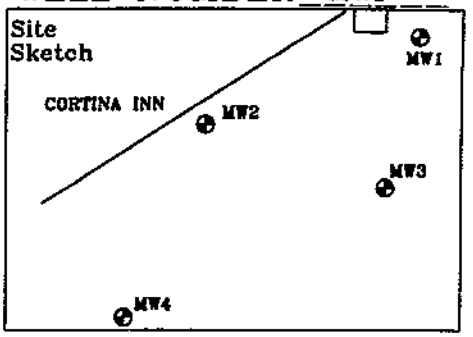
CASING DIA. 2" LENGTH 4.7' TYPE sch 40 pvc

DRILLING CO. T&K DRILLING METHOD HSA

DRILLER ALAN TOMMILA LOG BY C. WARD

WELL NUMBER MW1

Site Sketch



GRIFFIN INTERNATIONAL, INC

DEPTH IN FEET	WELL CONSTRUCTION	NOTES	BLOWS PER 6" OF SPOON & PID READINGS	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)	DEPTH IN FEET
0		ROAD BOX LOCKING WELL CAP CONCRETE			0
1					1
2		NATIVE BACKFILL			2
3		BENTONITE			3
4					4
5		WELL RISER			5
6			5'–7' 3/3/4/4 0.6 ppm	Dark gray/brown SILT, some fine to medium sand, plastic webbing in end of shoe.	6
7					7
8			7'–9' 4/5/8/13 1.2 ppm	Dark brown SILT, some medium to fine sand, moist bottom gray/brown fine to medium sand, some silt, moist.	8
9		SAND PACK			9
10			9'–11' 14/12/15/17 40 ppm	10.0' WATER TABLE ▼	10
11				Gray, fine to medium SAND, little silt, moist to wet, slight fuel oil odor.	11
12		WELL SCREEN	11'–13' 6/11/12/14 1 ppm	Gray, fine to medium SAND, little silt, wet, slight fuel oil odor.	12
13					13
14		BOTTOM CAP	13'–15' 12/9/8/10 5 ppm	Same as above, saturated.	14
15		BEDROCK		BASE OF WELL AT 15.0' REFUSAL AT 15.0'	15
16					16
17					17
18					18
19					19
20					20
21					21
22					22
23					23
24					24
25					25

PROJECT CORTINA INN

LOCATION MENDON, VERMONT

DATE DRILLED 9/1/98 TOTAL DEPTH OF HOLE 17.0'

DIAMETER 4.25"

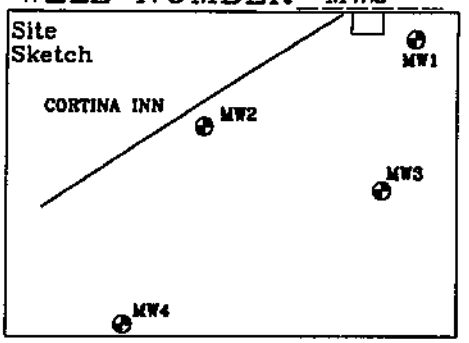
SCREEN DIA. 2" LENGTH 10.0' SLOT SIZE 0.010"

CASING DIA. 2" LENGTH 4.7' TYPE sch 40 pvc

DRILLING CO. T&K DRILLING METHOD HSA

DRILLER ALAN TOMMILA LOG BY C. WARD

WELL NUMBER MW2



GRIFFIN INTERNATIONAL, INC

DEPTH IN FEET	WELL CONSTRUCTION	NOTES	BLOWS PER 6" OF SPOON & PID READINGS	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)	DEPTH IN FEET
0		ROAD BOX			0
0		LOCKING WELL CAP			0
0		CONCRETE	0'-2' 0 ppm	Brown SILT and SAND, trace fine gravel.	0
1					1
2		NATIVE BACKFILL			2
3		BENTONITE			3
4					4
5		WELL RISER			5
5			5'-6' 27/39/50-1" 0 ppm	Tan SILT, some fine sand, little gravel.	5
6					6
7					7
8					8
9		SAND PACK			9
10				10.0' WATER TABLE ▼	10
11			10'-12' 13/15/17/19 0.2 ppm	Gray SILT and fine SAND, little fine gravel, wet, till.	11
12					12
13					13
14		BOTTOM CAP			14
15					15
15			15'-17' 22/24/33/29 0.2 ppm	Gray, fine to medium SAND, some silt, little fine gravel, wet.	15
16					16
17		UNDISTURBED NATIVE SOIL		BASE OF WELL AT 15.0'	17
17				END OF EXPLORATION AT 17.0'	17
18					18
19					19
20					20
21					21
22					22
23					23
24					24
25					25

PROJECT CORTINA INN

LOCATION MENDON, VERMONT

DATE DRILLED 9/1/98 TOTAL DEPTH OF HOLE 17.0'

DIAMETER 4.25"

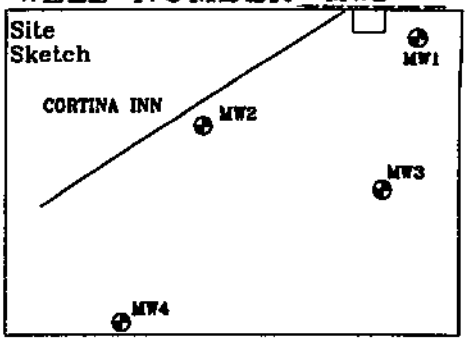
SCREEN DIA. 2" LENGTH 10.0' SLOT SIZE 0.010"

CASING DIA. 2" LENGTH 4.7' TYPE sch 40 pvc

DRILLING CO. T&K DRILLING METHOD HSA

DRILLER ALAN TOMMILA LOG BY C. WARD

WELL NUMBER MW3



GRIFFIN INTERNATIONAL, INC

DEPTH IN FEET	WELL CONSTRUCTION	NOTES	BLOWS PER 6" OF SPOON & PID READINGS	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)	DEPTH IN FEET
0		ROAD BOX			0
		LOCKING WELL CAP			
		CONCRETE		Asphalt	
1				Brown SILT and SAND.	1
2		NATIVE BACKFILL			2
3		BENTONITE			3
4					4
5		WELL RISER	5'-7' 1/2/3/3 0.4 ppm	Black SILT and organic material, peat, bottom 2" white medium to coarse sand.	5
6					6
7					7
8					8
9		SAND PACK			9
10				10.0' WATER TABLE ▼	10
11			10'-12' 5/5/8/10 0.2 ppm	Gray, fine SAND and SILT, wet.	11
12		WELL SCREEN			12
13					13
14		BOTTOM CAP			14
15					15
16			15'-17' 17/18/21/19 0.1 ppm	Gray, fine SAND and SILT, trace fine gravel, saturated.	16
17		UNDISTURBED NATIVE SOIL		BASE OF WELL AT 15.0' END OF EXPLORATION AT 17.0'	17
18					18
19					19
20					20
21					21
22					22
23					23
24					24
25					25

PROJECT CORTINA INN

LOCATION MENDON, VERMONT

DATE DRILLED 9/1/98 TOTAL DEPTH OF HOLE 15.0'

DIAMETER 4.25"

SCREEN DIA. 2" LENGTH 10.0' SLOT SIZE 0.010"

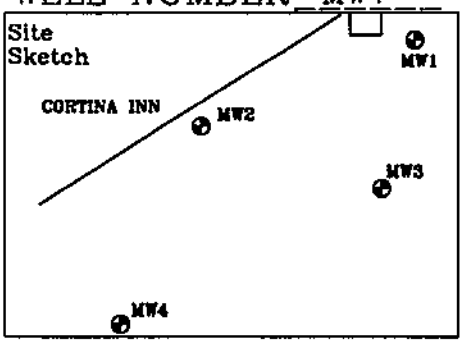
CASING DIA. 2" LENGTH 4.7' TYPE sch 40 pvc

DRILLING CO. T&K DRILLING METHOD HSA

DRILLER ALAN TOMMILA LOG BY C. WARD

WELL NUMBER MW4

Site Sketch



GRIFFIN INTERNATIONAL, INC

DEPTH IN FEET	WELL CONSTRUCTION	NOTES	BLOWS PER 6" OF SPOON & PID READINGS	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)	DEPTH IN FEET
0		ROAD BOX			0
		LOCKING WELL CAP			
		CONCRETE		Asphalt	
1			0.5'–2' 0.2 ppm	Brown SILT and SAND, trace gravel.	1
2		NATIVE BACKFILL			2
3		BENTONITE			3
4					4
5		WELL RISER			5
6			50 blows–no advance	No sample – cobbles/boulders	6
7					7
8					8
9		SAND PACK			9
10				10.0' WATER TABLE ▼	10
11			10'–12' 9/15/19/21 0.2 ppm	Gray, medium to fine SAND and SILT, little gravel, wet.	11
12					12
13					13
14		BOTTOM CAP			14
15					15
		BEDROCK	50 blows–no advance 15'–17' 0.1 ppm	Small amount of soil recovered in spoon: Gray, medium to fine SAND and SILT, little gravel, trace clay, wet.	
16					16
17				BASE OF WELL AT 15.0' REFUSAL AT 15.0'	17
18					18
19					19
20					20
21					21
22					22
23					23
24					24
25					25

APPENDIX C

Liquid Level Monitoring Data

LIQUID LEVEL MONITORING DATA

CORTINA INN
MENDON, VERMONT

9/10/98

Well I.D.	Well Depth bgs	Top of Casing Elevation	Depth To Product btoc	Depth To Water btoc	Product Thickness	Specific Gravity Of Product	Water Equivalent	Corrected Depth To Water	Corrected Water Table Elevation
MW-1	15.0	100.00	-	10.71	-	-	-	-	89.29
MW-2	15.0	98.47	-	11.05	-	-	-	-	87.42
MW-3	15.0	97.96	-	9.27	-	-	-	-	88.69
MW-4	15.0	94.75	-	7.11	-	-	-	-	87.64

All Values Reported in Feet

btoc - Below Top of Casing

bgs - Below Ground Surface

Elevations determined relative to top of casing of MW-1, which was arbitrarily set at 100'

APPENDIX D

Water Quality Data - Monitoring Wells

GROUNDWATER QUALITY SUMMARY

CORTINA INN
MENDON, VERMONT

MW-1

PARAMETER	Date of Sample Collection 9/10/98				VGES (ppb)
Benzene	ND > 2				5.
Toluene	ND > 2				1,000.
Ethylbenzene	12.6				700.
Xylenes	ND > 2				10,000.
Total BTEX	12.6				-
MTBE	ND > 20				40.
1,3,5-Trimethyl Benzene	7.5				4.
1,2,4-Trimethyl Benzene	20.8				5.
Naphthalene	98.4				20.
Total VOCs	139.3				-
TPH (mg/L)	3.24				

MW-2

PARAMETER	Date of Sample Collection 9/10/98				VGES (ppb)
Benzene	ND > 1				5.
Toluene	ND > 1				1,000.
Ethylbenzene	ND > 1				700.
Xylenes	ND > 1				10,000.
Total BTEX	ND				-
MTBE	ND > 10				40.
1,3,5-Trimethyl Benzene	ND > 1				4.
1,2,4-Trimethyl Benzene	ND > 1				5.
Naphthalene	ND > 1				20.
Total VOCs	ND				-
TPH (mg/L)	ND > 0.4				

BTEX Analysis by EPA 8021B, TPH Analysis by Modified EPA 8100

All Values Reported in ug/L (ppb) except TPH in mg/L (ppm)

ND>1 - None Detected above Detection Limit

TBQ<1 - Trace Below Quantitation Limit

NA - Not Analyzed

VGES - Vermont Groundwater Enforcement Standard > VGES

GROUNDWATER QUALITY SUMMARY

CORTINA INN
MENDON, VERMONT

MW-3

PARAMETER	Date of Sample Collection				VGES (ppb)
	9/10/98				
Benzene	ND>1				5.
Toluene	ND>1				1,000.
Ethylbenzene	ND>1				700.
Xylenes	ND>1				10,000.
Total BTEX	ND				-
MTBE	ND>10				40.
1,3,5-Trimethyl Be	ND>1				4.
1,2,4-Trimethyl Be	ND>1				5.
Naphthalene	ND>1				20.
Total VOCs	ND				-
TPH (mg/L)	ND>0.4				

MW-4

PARAMETER	Date of Sample Collection				VGES (ppb)
	9/10/98				
Benzene	ND>1				5.
Toluene	ND>1				1,000.
Ethylbenzene	ND>1				700.
Xylenes	ND>1				10,000.
Total BTEX	ND				-
MTBE	ND>10				40.
1,3,5-Trimethyl Be	ND>1				4.
1,2,4-Trimethyl Be	ND>1				5.
Naphthalene	ND>1				20.
Total VOCs	ND				-
TPH (mg/L)	ND>0.4				

BTEX Analysis by EPA 8021B, TPH Analysis by Modified EPA 8100

All Values Reported in ug/L (ppb) except TPH in mg/L (ppm)

ND>1 - None Detected above Detection Limit

TBQ<1 - Trace Below Quantitation Limit

NA - Not Analyzed

VGES - Vermont Groundwater Enforcement Standard > VGES

GROUNDWATER QUALITY SUMMARY
QA/QC SAMPLES

CORTINA INN
MENDON, VERMONT

9/10/98

PARAMETER	Trip Blank	Equipment Blank	Duplicate of MW-1	VGES (ppb)
Benzene	ND>1		ND>2	5.
Toluene	ND>1	No Sample	ND>2	1,000.
Ethylbenzene	ND>1	Disposable	13.8	700.
Xylenes	ND>1	ailers Used	TBQ<2	10,000.
Total BTEX	ND		13.8	-
MTBE	ND>10		ND>20	40.
1,3,5-Trimethyl Be	ND>1		7.9	4.
1,2,4-Trimethyl Be	ND>1		22.9	5.
Naphthalene	ND>1		105.0	20.
Total VOCs	ND		150.	-
TPH (mg/L)	NA		NA	

BTEX Analysis by EPA 8021B, TPH Analysis by Modified EPA 8100

All Values Reported in ug/L (ppb) except TPH in mg/L (ppm)

ND>1 - None Detected above Detection Limit

TBQ<1 - Trace Below Quantitation Limit

NA - Not Analyzed

VGES - Vermont Groundwater Enforcement Standard > VGES

APPENDIX E

Laboratory Analytical Report - Monitoring Wells

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

REPORT OF LABORATORY ANALYSIS

CLIENT: Griffin International
PROJECT NAME: Cortina Inn
REPORT DATE: September 14, 1998
DATE SAMPLED: September 10, 1998

PROJECT CODE: GICI1963
REF.#: 126,865 - 126,870

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. Chain of custody indicated sample preservation with HCl.

All samples were prepared and analyzed by requirements outlined in the referenced method and within the specified holding times. All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced method. Blank contamination was not observed at levels affecting the analytical results.

Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

Individual sample performance was monitored by the addition of surrogate analytes to each sample. All surrogate recovery data was determined to be within laboratory QA/QC guidelines unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

EPA METHOD 8021B--PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: Cortina Inn
CLIENT PROJ. #: 119741145

DATE RECEIVED: September 11, 1998
REPORT DATE: September 14, 1998
PROJECT CODE: GICI1963

Ref. #:	126,865	126,866	126,867	126,868	126,869
Site:	MW-1	MW-1 Duplicate	MW-2	MW-3	MW-4
Date Sampled:	9/10/98	9/10/98	9/10/98	9/10/98	9/10/98
Time Sampled:	17:00	17:00	16:45	16:15	16:30
Sampler:	W.J.D.	W.J.D.	W.J.D.	W.J.D.	W.J.D.
Date Analyzed:	9/14/98	9/14/98	9/13/98	9/13/98	9/13/98
UIP Count:	>10	>10	0	0	0
Dil. Factor (%):	50	50	100	100	100
Surr % Rec. (%):	96	100	88	91	96
Parameter	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)
MTBE	<20	<20	<10	<10	<10
Benzene	<2	<2	<1	<1	<1
Toluene	<2	<2	<1	<1	<1
Ethylbenzene	12.6	13.8	<1	<1	<1
Xylenes	<2	TBQ <2	<1	<1	<1
1,3,5 Trimethyl Benzene	7.5	7.9	<1	<1	<1
1,2,4 Trimethyl Benzene	20.8	22.9	<1	<1	<1
Naphthalene	98.4	105.	<1	<1	<1

RDB\006F0426

Ref. #:	126,870
Site:	Trip B.
Date Sampled:	9/10/98
Time Sampled:	6:00
Sampler:	W.J.D.
Date Analyzed:	9/13/98
UIP Count:	0
Dil. Factor (%):	100
Surr % Rec. (%):	90
Parameter	Conc. (ug/L)
MTBE	<10
Benzene	<1
Toluene	<1
Ethylbenzene	<1
Xylenes	<1
1,3,5 Trimethyl Benzene	<1
1,2,4 Trimethyl Benzene	<1
Naphthalene	<1

Note: UIP = Unidentified Peaks TBQ = Trace Below Quantitation NI = Not Indicated

LABORATORY REPORT

TOTAL PETROLEUM HYDROCARBONS (TPH) BY MODIFIED EPA METHOD 8100

DATE: September 24, 1998
CLIENT: Griffin International
PROJECT: Cortina Inn/119741145
PROJECT CODE: GICI1964
COLLECTED BY: WJD
DATE SAMPLED: September 10, 1998
DATE RECEIVED: September 11, 1998

Reference #	Sample ID	Concentration (mg/L)[1]
126,871	MW-1; 17:00	3.24
126,871A	MW-2; 16:45	ND[2]
126,871B	MW-3; 16:15	ND
126,871C	MW-4; 16:30	ND

Notes:

1 Values quantitated based on the response of #2 Fuel Oil. Method detection limit is 0.4 mg/L.
2 None detected

ENDYNE, INC.

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

GICI1964

19741145 126,865 — 126,871

CHAIN-OF-CUSTODY RECORD

28146

Project Name: CORTINA INN Site Location: MENDON VT	Reporting Address: GRIFFIN	Billing Address:
Endyne Project Number: GICI1963	Company: GRIFFIN Contact Name/Phone #: CHRIS WARD 865 4288	Sampler Name: WJD Phone #: 865 4288

Lab #	Sample Location	Matrix	GRAB	COMP	Date/Time 9-10-98	Sample Containers No.	Sample Containers Type/Size	Field Results/Remarks	Analysis Required	Sample Preservation	Rush
126,865	MW-1	GW	✓		1700	3	40ml VOA		EPA 602/B & MOD 8100 TPH	HCl/ICE	
126,866	MW-1 DUPLICATE				1700			8021B ONLY	NO TPH		
126,867	MW-2				1645						
126,868	MW-3				1615						
126,869	MW-4				1630						
126,870	TRIP B.	DIST. H_2O			0600			8021B ONLY	NO TPH		

Relinquished by: Signature	Received by: Signature	Date/Time 9-11-98 0800
Relinquished by: Signature	Received by: Signature	Date/Time

New York State Project: Yes ____ No ✓

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD_5	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify):										

APPENDIX F

Laboratory Analytical Report - Supply Well

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

REPORT OF LABORATORY ANALYSIS

CLIENT: Griffin International
PROJECT NAME: Cortina Inn/ # 119741145
DATE REPORTED: August 14, 1998
DATE SAMPLED: August 6, 1998

PROJECT CODE: GICI1132
REF. #: 125,289

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody record.

Chain of custody indicate sample preservation with HCl.

All samples were prepared and analyzed by requirements outlined in the referenced methods and within the specified holding times.

All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced methods.

Blank contamination was not observed at levels affecting the analytical results.

Analytical method precision and accuracy were monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

Individual sample performance was monitored by the addition of surrogate analytes to each sample. All surrogate data was determined to be within Laboratory QA/QC guidelines unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

EPA METHOD 602 COMPOUNDS BY EPA METHOD 8260

CLIENT: Griffin International
PROJECT NAME: Cortina Inn/#119741145
REPORT DATE: August 14, 1998
SAMPLER: Chris Ward
DATE SAMPLED: August 6, 1998
DATE RECEIVED: August 7, 1998

PROJECT CODE: GICI1132
ANALYSIS DATE: August 12, 1998
STATION: SW #1
REF.#: 125,289
TIME SAMPLED: 11:55

Parameter	Detection Limit (µg/L)	Concentration (µg/L)
Benzene	1	ND[1]
Chlorobenzene	1	ND
1,2-Dichlorobenzene	1	ND
1,3-Dichlorobenzene	1	ND
1,4-Dichlorobenzene	1	ND
Ethylbenzene	1	ND
Toluene	1	ND
Xylene	2	ND
MTBE	2	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

ANALYTICAL SURROGATE RECOVERY:

Dibromofluoromethane:	101.%
Toluene-d8:	95.%
4-Bromofluorobenzene:	101.%

NOTES:
1 None detected

ENDYNE, INC.

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY RECORD

#11974145

28151

Project Name: CORTINA INN Site Location:	Reporting Address: GRIFFIN	Billing Address: GRIFFIN
Endyne Project Number: GICI1132	Company: GRIFFIN Contact Name/Phone #:	Sampler Name: CHRIS WARD Phone #: 802 865-4288

Lab #	Sample Location	Matrix	GRAB	COMP	Date/Time	Sample Containers No.	Sample Containers Type/Size	Field Results/Remarks	Analysis Required	Sample Preservation	Rush
125289	SW #1	H_2O	✓		8/6/98 11:55	3	40 ml	601	20	HCl	
125290	SW #2	↓	↓		↓ 12:07	3	↓	601	20	↓	
	Cancel										
	SW #2										
	per telecon										
	w/ CW										
	8/7/98										

Relinquished by: Signature Chris Ward	Received by: Signature M. Lukin	Date/Time 8/7/98 10:00 a.m.
Relinquished by: Signature	Received by: Signature	Date/Time

New York State Project: Yes ____ No X

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD_5	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	(20)	EPA 601/602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify):										